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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,372	12/09/2003	Chinu P. Bhavsar	81093973	1371

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EXAMINER

VANAMAN, FRANK BENNETT

ART UNIT PAPER NUMBER

3618

DATE MAILED: 06/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/707,372

Applicant(s)

BHAVSAR ET AL.

Examiner

Frank Vanaman

Art Unit

3618

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-12 is/are allowed.
- 6) ☒ Claim(s) 1-7 and 13-16 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/09/03
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi (US 5,806,617) in view of Kawakatsu (US 4,335,429). Yamaguchi teaches a vehicle having a drive line (6), a battery (4) which stores electrical power, a sensor (14) which provides state of charge information and provides for the generation of a signal (steps 102, 108, etc), an electric motor (3) connected to the drive line and electrically to the battery, a variable displacement engine (2, see col. 13, line 66 through col. 14, line 5), wherein a number of active cylinders is increased based on a higher commanded engine torque output and decreased based on a lower commanded engine torque output, a controller (9, 10, 11, 12) which receives information from the battery sensor, an accelerator pedal (13) which transmits a signal proportional to a degree of depression (a), wherein the controller derives an engine torque signal (from 11) and a motor torque signal (from 12), wherein a desired torque is divided between engine and motor torque quantities (figures 5-6, col. 6, line 43 through col. 7, line 10), and further wherein the electric motor (bottom graph, figure 4) provides torque to the drive line in direct response to a transient torque demand (top graph figure 4- the transient demand being set by the change from a1-a2), the engine torque (EG TORQUE) not changing in direct response to the torque demand; wherein the vehicle may be operated such that a

requested driving torque is set such that 100% of the torque may be delivered by the motor (i.e., a maximum value) or that 100% of the torque may be delivered by the engine (again, a maximum value-- see col. 15, lines 60-65). As regards the employment of all engine cylinders above a given threshold, while the reference to Yamaguchi fails to specifically teach torque thresholds for selecting numbers of engine cylinders to be activated, the reference does teach that the number of cylinders operating is adjusted based on the load required (col. 14, lines 2-5), and in view of this teaching, it would have been obvious to one of ordinary skill in the art at the time of the invention to apportion the relationship of required torque to number of cylinders as based on specific thresholds so as to insure a consistent relationship between engine output and required torque.

The reference to Yamaguchi fails to specifically teach the comparison of the demanded torque to first and second thresholds, and deriving all torque from the motor when the demanded torque is below a first threshold, deriving some torque from the engine when the demanded torque is above a first threshold, and operating all cylinders when the demanded torque is above a second threshold. Kawakatsu teaches a motor/engine torque apportionment scheme wherein only motor drive is used when a torque value is below a first torque-speed threshold, and wherein the drive is divided up amongst an engine and motor when that threshold is exceeded. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a threshold based switching between motor-only to motor and engine modes as taught by

Kawakatsu's threshold-based system, for the purpose of insuring a positive switching point between one mode and another.

As regards the derivation of all torque from the engine when the battery state of charge is below a given value, it is not considered to be beyond the skill of the ordinary practitioner to prohibit electric drive and rely solely on engine drive when the state of charge is below a predetermined value, in order to allow the batteries to be charged and the vehicle driven, for the purpose of insuring that the battery state of charge is not reduced to zero, rendering the vehicle inoperative.

3. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi in view of Chhaya et al. (US 6,484,833, filed 3/2000). The reference to Yamaguchi is discussed above and fails to teach the use of battery state of charge to control the application of the engine and or motors for driving the vehicle. Chhaya et al teach a system for apportioning driving force from a vehicle wherein a state of charge is monitored, and compared to a plurality of values (see figure 3) which are based on different torque distributions (see 54, 58, 62, 66) and wherein if a state of charge is below a given value, then engine-only drive is employed(see figures 4, 5), and wherein when the state of charge is above the value, engine and motor drive is accomplished. It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the mode switching system of Chhaya, based on a battery state of charge, with the hybrid drive of Yamaguchi having a variable capacity engine, for the purpose of insuring that the battery state of charge is not depleted, which would render the vehicle inoperative.

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Allowable Subject Matter

4. Claims 8-12 are allowed.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Severinsky et al. (US 6,554,088), Oshima et al. (US 6,603,278), and Minowa et al. (US 6,692,405) teach vehicle structures and operating schemes of pertinence.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to F. Vanaman whose telephone number is 703-308-0424. Any inquiry of a general nature or relating to the status of this application should be directed to the group receptionist whose telephone number is 703-308-1113.

As of May 1, 2003, any response to this action should be mailed to:

Mail Stop _____
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450,

Or faxed to one of the following fax servers:

Regular Communications/Amendments: 703-872-9326
After Final Amendments: 703-872-9327
Customer Service Communications: 703-872-9325

F. VANAMAN
Primary Examiner
Art Unit 3618



6/23/04